



## State of Nevada – Department Of Personnel

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### CLASS SPECIFICATION

<u>TITLE</u>	<u>GRADE</u>	<u>EEO-4</u>	<u>CODE</u>
<b>STAFF III, REGISTERED PROFESSIONAL ENGINEER</b>	<b>40*</b>	<b>B</b>	<b>6.226</b>
<b>OPTIONS: <u>DEPARTMENT OF TRANSPORTATION</u></b>			
<b>A. Construction Division</b>			
<b>B. Environmental Services Division</b>			
<b>C. Location, Photogrammetry and Cartography Division</b>			
<b>D. Maintenance Division</b>			
<b>E. Materials and Testing Division</b>			
<b>F. Operations Analysis Division</b>			
<b>G. Road Design Division</b>			
<b>H. Safety Engineering Division</b>			
<b>I. Structural Design Division</b>			
<b>J. Districts</b>			
<b><u>DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES</u></b>			
<b>K. Division of Environmental Protection</b>			
<b>L. Division of State Parks</b>			
<b>M. Division of Water Planning</b>			
<b>N. Division of Water Resources</b>			
<b><u>DEPARTMENT OF HUMAN RESOURCES</u></b>			
<b>O. Bureau of Health Protection Services</b>			
<b><u>UNIVERSITY OF NEVADA</u></b>			
<b>P. UNLV - Telemedia Services</b>			
<b>Q. UNR - Department of Chemistry</b>			

Under direction, perform staff engineering work requiring considerable professional training and experience demonstrating a capacity to perform at a high level of competency; typically responsible for assigning and reviewing work of lower-level engineering employees. Work requires discretionary judgment in interpreting and applying federal and State regulations and departmental/divisional policies and procedures, accurate analysis and evaluation of complex engineering programs/functions, and soundness of judgment exercised with respect to recommendations.

Positions at the Staff III level perform professional engineering functions requiring the exercise of judgment in the analysis of complex data and the application of recognized concepts and principles to difficult problems that impact daily operations, recommendations and the development of new policies, procedures and organizational areas or services. Activities consist of duties that result in significant portions of decisions made in conjunction with others and provide control of outcome of decisions. Positions at this level deal with management at a higher level at or above the supervisor's level and include both internal and external contacts for the purpose of negotiating solutions to major and/or controversial issues within policy guidelines.

**\* Reflects a 2-grade, special salary adjustment authorized by the 2001 Legislature to improve recruitment and retention.**

**DEPARTMENT OF TRANSPORTATION**

**Materials and Testing Division**

**Concrete Operations Section:** Provide technical expertise when problems occur in concrete pavements and bridge decks during construction and after completion of the project; develop new concepts on design of rigid pavement to determine the cause of pavement deterioration and to develop appropriate cost effective and practical alternatives for new construction and repair of existing pavement; perform various functions involved with specifications to include writing specifications for new products or new design procedures related to concrete; review special provisions and plans for new projects prior to advertisement to ensure proper specifications and special details have been included; and review technical information for approval of products which the contractor proposes to use in concrete pavement or bridge decks.

**Geotechnical Branch:** Perform investigations to obtain quantitative and qualitative information for analysis and provide samples for the laboratory; analyze field and laboratory data, facility design plans and documents, and available secondary site information to develop geotechnical designs and solve construction, maintenance, environmental and earthquake engineering problems.

Perform reviews to determine if geotechnical recommendations have been followed, evaluate the possibility of unidentified geotechnical problems, and verify that geologic and seismic hazards have been satisfactorily addressed.

Perform comprehensive geological and/or geotechnical engineering analyses for the purpose of proposing specific design and construction recommendations and specifications for highway transportation facilities with special emphasis placed upon the mitigation of geotechnical problems and geologic hazards.

**Research and Development Program:** Identify research priorities through assessing needs, planning the program and ranking research and development programs; review proposals for content, technical application and potential benefit of improved quality engineering or economics; provide technical recommendations on the feasibility of the research and development proposal; conduct literature research and feasibility studies on new products; initiate and implement research activities on highway construction materials; prepare and issue detailed technical research reports; provide technical assistance to the users of new technology and develop guidelines; appropriate research funds; develop cooperative research agreements; and develop educational programs for the department.

Analyze variables which affect pavement performance and minimize its cost; conduct studies of pavement rehabilitation techniques to provide criteria for pavement performance prediction; develop project priorities for statewide resurfacing, restoration and rehabilitation projects; and recommend revenue increases required to bring and maintain the condition of the State's highways at an acceptable level.

Develop and report various highway funding scenarios for department administration, the Citizen's Advisory Committee on Transportation, the Transportation Board, and the legislature to predict future revenues.

**Road Design Division**

**Hydraulics Section:** Design highway drainage systems to include designing the size, shape and location of culverts; storm drain systems of inlets, manholes and pipes; open channels; detention and retention structures; and energy dissipation structures; design and draw special details to depict construction details of out-of-the-ordinary drainage facilities not included in standard plans; calculate pipe strengths to ensure structural adequacy of pipes under special loading conditions; perform pipe buoyancy calculations to ensure buoyant forces acting on pipes are not great enough to overcome the gravitational forces that act to keep a pipe anchored to the ground; design highway subdrainage systems to provide drainage of water beneath the pavement surface; determine economic, environmental and safety consequences of alternate hydraulic designs so that the most appropriate design can be selected; maintain records of temporary and/or seasonal employees.

**DEPARTMENT OF TRANSPORTATION** (cont'd)

**Road Design Division** (cont'd)

**Consultant Administration Section:** Coordinate and review consultant's preliminary and final design of transportation projects, giving special attention to the plans, specifications and estimate package to ensure the design is in compliance with federal and State regulations and department policy.

Coordinate and review encroachment permits dealing with the roadway system to determine which division/section needs to be involved in the permit process; ensure involved divisions review the application and work with the permittee until permit problems are resolved.

Coordinate and review the project scoping for the Resurfacing, Restoration and Rehabilitation Committee (3R Committee); works up cost estimates for each 3R project chosen by the committee, and set up field reviews for every project.

Perform special projects and studies for the division requiring extensive research to include specific recommendations for management decision-making.

**Structural Design Division**

**Bridge Design and Contract Administration/Technical Support Sections:** Prepare preliminary design of new bridges and major modifications of existing bridges; perform preliminary structural analysis to ensure the integrity of initial structural elements; prepare preliminary cost estimates for each structure type based on a comparison of initial cost, constructability, safety, maintainability and aesthetic value; develop a preliminary plan sheet showing basic geometric and structural features of selected structural type; and distribute approved preliminary plan sheet to appropriate agencies and divisions.

Prepare final design on structural design projects which include new bridges, widening and/or rehabilitation of existing bridges, seismic retrofit of substandard bridges, retaining walls, traffic signalization structures, hydraulic structures and maintenance structures.

Coordinate project activities with departmental divisions and various private and public agencies to determine and address their requirements on projects; contact manufacturers, suppliers and fabricators to obtain information regarding the availability and cost of products intended for use on projects; participate in public hearings to inform the public and receive comments about upcoming projects related to the division; participate in preliminary site investigations with other division representatives to determine construction feasibility and structural design features; and participate in value engineering studies of proposed projects to investigate cost saving alternatives.

Check structural analysis and designs of other designers to ensure accuracy and compliance with department standards and review the working drawings of contract plans prepared by others to ensure accuracy of details, compliance with department standard practice and feasibility of construction; check shop drawings for construction projects and assist in solving structural related construction problems.

Assign and review work of rotational engineers and engineering student aids and train assigned staff in the operations of the division to include policies and procedures.

**Contract Administration/Technical Support Section:** Perform a majority of the day-to-day work related to the administration of contracts with consultant engineering firms. Specifically: work on a day-to-day basis with the consultant; perform the initial engineering review and evaluation of all structural design products prepared by the consultant; serve as the initial point of contract administration for consultant designed projects including: a) review of periodic progress reports, b) review of invoice payments, c) contact point for setting meetings and discussing project issues, and d) preparation of project correspondence; and perform the majority of the detailed work needed to ensure the department meets its project responsibilities under the terms of the consultant agreement.

**DEPARTMENT OF TRANSPORTATION** (cont'd)

**Structural Design Division** (cont'd)

**Contract Administration/Technical Support Section (cont'd)**

Perform the majority of work needed to gather, synthesize, evaluate, and implement changes in structural design technology; provide plan checking for the Bridge Design Section and provide structural designs on special projects.

**Bridge Inspection/Maintenance Section:** Identify new, replaced and rehabilitated bridges to maintain an up-to-date inventory of all bridges in the State and map the location of each bridge for future scheduling purposes; develop inventory records for all new, replaced or rehabilitated bridges; perform structural analysis to determine inventory and operating load ratings required by federal law for inclusion in the inventory; and update existing bridge inventory files to comply with federal requirements and provide updated data to local and regional federal offices and other interested agencies.

Perform bridge inspections and document bridge inspections, deficiencies and maintenance strategies to determine bridge condition ratings for the National Bridge Inventory and determine the prioritization of budgets for bridge maintenance.

**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES**

**Division of Environmental Protection**

**Bureau of Air Quality:** Coordinate with other branches of the bureau the permitting of sources under the Prevention of Significant Deterioration Major Source Program; conduct an in-depth review of the application to determine the adequacy of the proposal to meet applicable air quality standards; draft permit conditions; coordinate special projects within the bureau; develop and assist in the maintenance of departmental and divisional information pamphlets; and develop, test, implement and/or maintain various computer programs for use within the bureau to aid in the performance of bureau functions.

**Bureau of Water Permits and Compliance - Permits Branch:** Perform site evaluation and characterization functions to include researching water quality data for the area; researching the hydrology of the area to determine which surface water and/or groundwater aquifer will be impacted by the discharge; researching topographic maps and demography of the area of proposed discharge; conducting on-site inspections of the facilities proposing to discharge to determine if incidental impacts are probable or if additional discharges need to be permitted; determining the location for monitoring wells; meeting with local government officials in order to address concerns regarding the permitting process; and issuing water pollution control discharge permits.

Participate in the development of regulations and policies for review and approval by the bureau chief and division administrator to promote changes that will further protect the water quality of the state.

Assist in the preparation of annual budgets and workplans for submittal to the federal Environmental Protection Agency and division administrator to ensure that funding will be obtained in a timely manner.

**Bureau of Mining Regulation/Reclamation - Mining Regulation Branch:** Process water pollution control permits and prepare fact sheets, notices of intent to issue or deny application, notices of final decision and responses to comments regarding public notices.

Conduct field inspections to implement regulations governing water pollution control; establish the need for additional monitoring and permit limitations; conduct investigations that include sampling and recognizing incidents of regulatory noncompliance; provide technical advice and guidance; and prepare accurate inspection reports based on findings with emphasis on engineering design, construction operation and closure to include recommendations.

**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES** (cont'd)

**Division of Environmental Protection** (cont'd)

**Bureau of Mining Regulation/Reclamation - Mining Regulation Branch** (cont'd)

Administer enforcement/compliance process by establishing a record of facts; compare conditions with laws and regulations for environmental and legal ramifications; substantiate noncompliance; write a record of finding to list non-compliance activities; establish a dialogue to resolve environment concerns with minimal formal administrative action; and initiate enforcement action to correct environmental degradation and to deter further environmental damage.

**Bureau of Wastewater Treatment Services - Technical Services Branch:** Develop an annual schedule for inspection of all sewage treatment plants in the state and coordinate the schedule with staff of the Consumer Health Protection Service; perform compliance inspections of permitted wastewater treatment works; prepare written reports of inspections and report observed permit violations to the Bureau of Permits and Compliance; perform inspection of treatment works under construction to verify installation is in accordance with approved plans and specifications; and investigate reports of suspected unauthorized discharges to document violations of discharge permits or the Nevada Water Pollution Control Law.

Review and approve documents, reports and studies related to the development of wastewater treatment works projects to verify compliance with State law and conformance with proven design criteria and division policy; review and approve operation and maintenance manuals developed for specific treatment works; review and approve plans, specifications and locations for groundwater monitoring wells, piezometers and other surface monitoring devices used to record trends in groundwater quality at the site of the treatment works; and attend design review meetings with representatives of the treatment works and consulting engineers to clarify review comments, discuss alternatives and resolve conflicts.

Administer Environmental Protection Agency grants for training and outreach assistance for rural wastewater treatment plant operators and managers of rural wastewater utilities.

**Bureau of Waste Management - Consultant Certification/Superfund Branch:** Perform preliminary assessments of hazardous substance releases to determine the impact to public health, safety or the environment; evaluate imminent threat to human health and the environment; conduct site reconnaissance; and prepare preliminary assessment reports to include engineering evaluations, technical writing, and construction of figures, diagrams and maps.

Perform site investigations to evaluate the site's potential threat to human health and the environment and provide emergency response to reports of spills or incidents.

**Bureau of Water Quality Planning - Planning and Standards Branch:** Develop water quality standards by proposing revisions to the water quality standards regulations; soliciting response to proposed regulations from businesses, governmental agencies and the public to ensure proposed regulations are understood and make changes if necessary; presenting the proposed regulations to the Environmental Commission; and filing the adopted regulations with the Secretary of State.

Manage water quality data and perform file maintenance functions to ensure data is current and correct.

Compute total maximum daily loads and waste load allocations for waterbodies that are in violation of standards so that loads and load reductions can be allocated and compliance with water quality standards can be achieved.

**Division of State Parks**

Develop engineering designs for State Parks projects; present conceptual designs to the design team in order to select a preferred alternative for design; prepare detailed designs and specifications of the option selected

**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES** (cont'd)

**Division of State Parks** (cont'd)

during the conceptual design process in order to develop contract documents; and prepare the final design which will solve the given problem in an efficient manner, be easy to maintain, and meet all applicable codes and regulations.

Prepare a contract which will govern the construction of the project to include compliance with all applicable federal, State and local regulations; prepare and distribute notice inviting bids to inform potential bidders on how they may obtain a copy of the specifications, the time and place of the pre-bid meeting, and the date, time and place of the bid opening; manage the distribution of plans and specifications to ensure fairness in the bidding process; conduct the bid opening in order to select a contractor to construct the project; execute a contract; administer the construction program in order to complete the project within schedule and budget; prepare and publish a notice of completion; verify that all legal requirements governing termination of the construction contract have been met in order to process the contractor's final billing and close out the contract; documents changes to park facilities; prepare operating manuals of newly installed facilities; and conduct a meeting with all interested personnel to review the project and recommend procedural or design changes to avoid problems on future projects.

Perform engineering activities involved in the monitoring for leakages of underground storage tanks and piping containing gasoline or diesel fuel to comply with federal and State environmental regulations.

Provide technical oversight and expertise by overseeing construction performed by field staff to ensure compliance with all codes, regulations and policies governing construction within state parks; providing technical expertise in civil engineering to designers and planners from different backgrounds to ensure technical adequacy of their work; and planning and overseeing field surveys, mapping, soil tests, and other engineering services in support of smaller projects being constructed by field staff.

**Division of Water Planning**

Develop forecasts of water demands for future needs of the State by projecting future growth trends based on analysis of past growth in population, agriculture and mining, and combining projected trends with available water use data to identify areas where additional water supplies will be needed in the future and to develop courses of action and feasible alternatives to meet demands; and develop estimates of available water supply for use in the various groundwater aquifers and river systems in the State.

Evaluate potential water projects to determine their technical feasibility and perform hydrologic and hydraulic studies to determine the most feasible location for the project, develop conceptual designs of the project and determine whether or not the project meets the water supply needs of the project participants.

Prepare technical reports concerning the results of water demand forecasts by writing a draft text, developing tables, generating figures, and editing corrections and updates to the text.

**Division of Water Resources**

Perform system administrative duties to support and maintain the division's computer system, a Unix based local area network; coordinate activities with the U.S. Geological Survey and other agencies in establishing connectivity to a wide area network; ensure quality control standards for database entry; research and utilize new computer technology such as a geographic information system; obtain and use computer programs for simulation of groundwater flow to enable the division to make decisions more effectively concerning the appropriation of water resources.

**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES** (cont'd)

**Division of Water Resources** (cont'd)

Take claims of vested water rights (Grandfather W.R. pre 1905); evaluate for historical accuracy and prepare a Preliminary Order of Determination; hold hearings on objectives; prepare a Final Order of Determination and testify in District Court as to hydrographic findings, historical documents and crop water consumption; and prepare an abstract of claims and final Decree for the District Judge's signature.

Perform technical and statutory review of water right applications to determine whether the application is acceptable to be filed and published for public notice or the application is defective and must be returned for correction.

Perform review of proofs of beneficial use; reject any proofs of beneficial use that have discrepancies and return them to the sender for corrective action; distribute copies of the proofs of beneficial use and cultural maps appraised as technically correct to the appropriate offices or field investigation teams; and maintain and update records of proofs of beneficial use.

Perform field investigations to verify the accuracy of statements in submitted proofs of beneficial use and cultural maps and to ascertain non-use of the water right.

Review the more complex and controversial water rights applications and prepare tentative permit terms and conditions to include supporting map, division records, engineering reports and maps, and water right abstracts to determine the availability of water, any conflict with existing water rights, and any detrimental effect upon public interest.

Review work of lower level staff members.

**DEPARTMENT OF HUMAN RESOURCES**

**Bureau of Health Protection Services**

Review and approve engineering plans and specifications for subdivision maps, the construction of public drinking water systems, public swimming pools and spas, public accommodations, State Public Works Board projects and schools, jails, food and drink establishments, recreational vehicle parks and individual wastewater disposal systems in order to code the standards which apply to the design for the purpose of protecting the public and the environment from dangerous health impacts and promote proper sanitation and safety in the product.

Research statutes, codes, standards, technical publications and reports for the purpose of revising and/or developing regulations which, after obtaining comments from public and local governments and from public hearings, are submitted to the State Board of Health for adoption.

Perform inspection, investigation and enforcement functions to ensure the promotion of acceptable standards of public health, sanitation, cleanliness and safety by inspecting the construction and operation of facilities and systems regulated by the State Board of Health to determine compliance with the design and applicable regulations; investigating deviations from the regulations and standards to determine the facts, causal factors, responsibility for the problem and the severity of degradation of the problem; prescribing corrective action and/upon satisfactory correction, removing restrictions.

Provide professional consultation to the private and public sector and at engineering functions to enhance and promote public health, sanitation, cleanliness and safety in the State.

**UNIVERSITY OF NEVADA**

**UNR - Department of Chemistry**

Perform complex levels of electronic engineering design for research programs; conceptualize unique electronic systems; write specifications, estimate costs and prepare budget proposals for research grants; and provide technical input for proposals for new instruments for instructional purposes.

Maintain department electronics equipment to include calibrating and performing periodic maintenance of spectrophotometers; calibrate and perform periodic maintenance of nuclear magnetic resonance spectrometers to ensure proper operating resolution is maintained; and repair all malfunctioning electronic equipment by procuring schematics, determining the cause of the malfunction and replacing defective parts.

Facilitate site preparations to include reviewing new equipment requirements; coordinate buildings and grounds crews that install new site plumbing, etc.; and install new equipment and ensure the equipment meets manufacturers' specifications so that accurate data may be obtained.

Perform administrative functions to include informing and advising the department's Instrumentation Committee of current needs for instructional purposes to ensure teaching labs are fully functional and current; writing the specifications for new instructional equipment to be sent out for bid so that the correct equipment is purchased to meet specific needs; teaching proper instrument operation to lower level technicians, graduate students and teaching fellows; purchasing electronic parts in order to supply teaching and research labs and to supply design and repair projects; and verifying that all equipment on the inventory manifest is accounted for.

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**MINIMUM QUALIFICATIONS**

**SPECIAL NOTES AND REQUIREMENTS:**

- \* Any person appointed to this class on or after July 1, 1995 must be registered as a Professional Engineer in the State of Nevada, unless that person is a registered Professional Engineer in another state; in that case, that person must become registered as a Professional Engineer in Nevada within six months of appointment as a condition of employment.
- \* Positions in this class may require specialized education and experience which will be identified at the time of recruitment.
- \* Specific duties and knowledge, skills and abilities for those options not described in this class specification may be determined at the time positions are classified. Positions being classified must meet the entry level knowledge, skills and abilities common to all options. Judgment must be applied in determining the degree to which a specific position being classified meets the intent of the class concept.

**ALL OPTIONS**

**EDUCATION AND EXPERIENCE:** Bachelor's degree from an accredited college or university in civil engineering or a closely related engineering field and four years of progressively responsible professional engineering experience in civil engineering or a closely related engineering field; **OR** two years of experience comparable to the Staff II, Associate Engineer or Supervisor II, Associate Engineer. (*See Special Notes and Requirements*)



### MINIMUM QUALIFICATIONS (cont'd)

ENTRY LEVEL KNOWLEDGE, SKILLS AND ABILITIES (required at time of application):

#### ALL OPTIONS

**Detailed knowledge of:** engineering principles and practices. **Knowledge of:** computer software programs applicable to the job. **Ability to:** perform advanced engineering calculations; communicate orally using appropriate vocabulary and grammar to obtain and provide information and to explain policies and procedures to persons of varying levels of engineering understanding; work as part of a team; analyze information, technical data, problems, situations or procedures to define a problem or objective; identify relevant concerns or factors; identify patterns, tendencies and relationships; recognize alternatives and their implications; complete heavy workload within established time frames; adapt to changes in workload and adjust priorities quickly as circumstances dictate; perform a variety of duties, often changing from one task to another of a different nature; perform under the stress of frequent interruptions and/or distractions; work independently and follow through on assignments with minimal direction; set priorities which accurately reflect the relative importance of the job responsibilities; establish and maintain effective working relationships with other employees and management to complete tasks quickly and with as few inconveniences as possible; operate a personal computer; review and check the work of others. **Skill in:** reading, comprehending and preparing advanced technical documents to complete required duties.

#### DEPARTMENT OF TRANSPORTATION

##### Materials and Testing Division

**Concrete Operations Section - General knowledge of:** soil mechanics, reinforced concrete, construction engineering, pavement design, roadway design, strength of materials, calculus and differential equations, environmental engineering, and non-destructive testing of concrete. **Ability to:** understand roadway and structural plans.

**Geotechnical Branch - Working knowledge of:** calculus, geology, geomorphology, geophysics, seismology, ground water hydrology and seepage, photogeology, surveying, earthquake engineering, geotextile engineering, engineering economy, fluid mechanics, and rock mechanics to recognize natural hazards and conduct geotechnical engineering analysis; soil mechanics testing equipment such as triaxial, resilient modulus, consolidometer, and direct shear to conduct soil testing. **Knowledge of:** occupational safety hazard and department safety regulations. **Ability to:** inspect geotechnical engineering designs and analyze and judge whether they are within the prescribed engineering standards; modify and/or adapt geotechnical engineering designs, procedures or methods in order to achieve a logical and engineering-correct solution to a problem; analyze complex technical data such as seismic behavior of soils using logic and quantitative reasoning; visualize the geologic processes that formed the sub-surface conditions at a site in a way that may influence structure foundation design or construction; visualize the short and long term impact of a structure on the geological environment of a site and seismic environmental impact on the structure; read geological, topographical and hydrological maps; use sub-surface investigation techniques to get information on the nature and types of soils and rocks underlying the project site; use sub-surface sampling and testing techniques; use surveying instruments and field techniques to locate project sites and field locations; use geologic field techniques such as detailed line mapping to obtain geologic information; use geologic compass to measure rock discontinuities.

**Research and Development Program - General knowledge of:** construction engineering, roadway design, environmental engineering, pavement design and strength of materials.

##### Operations Analysis Division

**Working knowledge of:** modern principles and practices in civil engineering and engineering economics related to the design, construction and maintenance of transportation facilities. **Ability to:** work independently laying out projects, performing complex analysis, and reporting the results with a minimum of supervision and remain accountable for timely and accurate completion of assigned tasks; write and

### MINIMUM QUALIFICATIONS (cont'd)

#### ENTRY LEVEL KNOWLEDGE, SKILLS AND ABILITIES (cont'd)

#### DEPARTMENT OF TRANSPORTATION (cont'd)

##### Operations Analysis Division (cont'd)

modify existing computer programs on the mainframe computer for sorting, merging, tabulating, graphing, and statistically analyzing pavement condition, construction, maintenance and other costs.

##### Road Design Division

**Hydraulics Section - Knowledge of:** hydrology, open channel flow, fluid mechanics and statistics to understand surface water movement and perform hydrologic calculations; fluid mechanics and open channel hydraulics sufficient to understand and apply the principles involved in storm drain design, culvert design, channel design, energy dissipator design and water surface profile determination; statics, mechanics of materials and soil mechanics to calculate pipe strengths. **Ability to:** draw scale plan and profile views of proposed hydraulic structures; calculate lengths, surface areas, volumes and weights so that cost estimates can be made; read and interpret aerial photographs, topographic maps and highway plans so that these resources can be effectively utilized in the hydraulic design process.

**Consultant Administration Section - Working knowledge of:** highway engineering principles required to design a highway project and assemble a set of plans, specifications and estimates for the bidding and construction process.

##### Structural Design Division

**Bridge Design and Contract Administration/Technical Support Sections - Detailed knowledge of:** modern structural analysis and design methods and the proper application of these methods to prestressed concrete, reinforced concrete, steel, timber and masonry; civil and structural engineering terminology. **Working knowledge of:** structural design manuals utilized by the division; basic principles of physics, mechanics of materials, statics, and structural dynamics. **General knowledge of:** chemistry and metallurgy and their relation to engineering materials; chart, graph and table formatting. **Ability to:** apply knowledge of structural analysis and design methods properly during the course of design and construction of projects.

**Bridge Inspection/Maintenance Section - Detailed knowledge of:** bridge inspection principles and techniques; principles of physics and engineering mechanics and their application to structural analysis and design. **Working knowledge of:** bridge design and construction procedures and terminology. **General knowledge of:** the American Association of State Highway and Transportation Officials' standard specifications for highway bridges; the department's standard specifications for road and bridge construction.

#### DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

##### Division of Environmental Protection

**Bureau of Air Quality - Working knowledge of:** chemical and mechanical engineering principles and mathematics such as gas laws, fluid flow laws, trigonometry, calculus and various units of measure; electrical systems associated with monitoring equipment, calibration techniques and the use of specialized tools such as voltmeters and data recording devices. **General knowledge of:** the fundamental nature of the criteria pollutants and air topics, including their impacts on the environment and living organisms.

**Bureau of Mining Regulation/Reclamation - Mining Regulation Branch: Working knowledge of:** engineering principles, practices and nomenclature and their application to environmental regulations. **Ability to:** apply human relations skills for effective persuasion for implementation of regulations in peaceful and in adverse conditions; write legally binding permits.

**MINIMUM QUALIFICATIONS (cont'd)**

**ENTRY LEVEL KNOWLEDGE, SKILLS AND ABILITIES (cont'd)**

**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES (cont'd)**

**Division of Environmental Protection (cont'd)**

**Bureau of Wastewater Treatment Services - Technical Services Branch:** **Ability to:** perform inspections of all types of treatment works to verify compliance with discharge permit requirements and applicable laws and regulations.

**Bureau of Waste Management - Consultant Certification/Superfund Branch:** **Working knowledge of:** engineering principles, practices and nomenclature and their application to environmental laws. **General knowledge of:** commonly used statistical tests used to assess analytical data in determining if a significant increase in a contaminant has occurred. **Ability to:** interact diplomatically, communicate and use the English language effectively with people of various social, cultural, economic and educational backgrounds to address questions regarding environmental regulations and address spill or incident reports.

**Bureau of Water Quality Planning - Planning and Standards Branch:** **Working knowledge of:** chemical principles, chemical nomenclature, and water chemistry; wastewater treatment principles and practice.

**Division of State Parks**

**Working knowledge of:** various published estimating guides; construction contracting procedures sufficient to write, execute, and administer construction and consulting contracts. **Knowledge of:** principles and techniques of civil engineering design; construction estimating procedures. **Ability to:** evaluate a site to determine its suitability for the proposed improvement based on factors such as topography, drainage, soil types, vegetation, distance to existing utilities, aesthetics, and environmental concerns; locate and recognize boundary markers in the field and correlate them to maps and legal descriptions for the purpose of determining the location of a proposed improvement in relation to property lines; identify features of a site critical to the design of the proposed improvement and design and implement a survey plan to locate and describe those features; calculate material quantities by examining and interpreting technical drawings; operate surveying instruments and properly record readings; identify soil types by appearance, texture, and other physical properties; locate underground water, sewer, power, and telephone lines using existing drawings, surface features, locating equipment, and experience; appraise construction work in progress to determine quality of workmanship and materials and verify compliance with specifications; review drawings, specifications, and other material prepared by others to determine technical adequacy, compliance with codes and regulations, and suitability to the site; read, interpret and apply various laws, codes, and regulations which govern design and construction; create computer programs and/or use existing programs to perform surveying or engineering calculations or to model physical phenomena.

**Division of Water Planning**

**Working knowledge of:** hydrologic systems. **General knowledge of:** State statutes, laws, reports, customs and usage regarding water rights and water planning. **Ability to:** perform advanced hydraulic, hydrologic and other engineering related calculations with limited supervision; interpret, analyze and summarize complex technical data.

**Division of Water Resources**

**Working knowledge of:** Nevada Water Law, rulings and orders of the State, engineering policies of the division, regulations for the drilling of water wells and related drilling, certain court actions, interstate compacts, intrastate water agreements and federal government water policies; procedures to conduct hearings; surveying conventions and symbols; computer hardware and software to include data base management and engineering computer technology. **Ability to:** perform hydrographic engineering calculations; perform surveying calculations; write concise, logical, grammatically and factually correct draft rulings of the State Engineer or analytical reports to advise the State Engineer on water related issues.

### MINIMUM QUALIFICATIONS (cont'd)

#### ENTRY LEVEL KNOWLEDGE, SKILLS AND ABILITIES (cont'd)

#### DEPARTMENT OF HUMAN RESOURCES

##### Bureau of Health Protection Services

**Detailed knowledge of:** engineering principles and data such as surveying, consultation, investigation, evaluation, planning and design, construction and operation of public and private utilities, structure, building, machine, equipment, process work or project wherein the public welfare in the safeguarding of life, health or property is involved. **Working knowledge of:** mathematics to include differential and integral calculus for the purpose of understanding technical reports on fluid dynamics in open channels, full and partially full conduits and sheet flow. **Ability to:** check application documents against requirements in the regulations; write a comprehensive letter which describes in detail the corrections necessary to the project design in order to approve the project; review resubmissions; orally communicate with engineers and owners regarding their application and design, State regulations, codes, standards and fees; inspect and evaluate construction of projects and, where appropriate, direct corrections and remedial action on the spot when irregularities are observed; review and approve engineering standard design specifications and design details submitted by special districts who are delegated some regulatory review authority over their system; determine compliance with direction provided on new construction or on previously constructed infrastructure being inspected and direct correction action; organize meetings and hearings to provide information to the public on public health care regulations; assist/consult with private and public sector on public health objectives and technical matters.

#### UNIVERSITY OF NEVADA

##### UNR - Department of Chemistry

**Working knowledge of:** electrical engineering principles to design or modify electronic circuits. **Knowledge of:** nuclear magnetic resonance spectrometry; optics cleaning methods, materials and equipment. **Ability to:** fabricate printed circuit assemblies including layout, loading soldering and wire wrapping; interpret mechanical and electrical drawings and specifications for spectrometer repair and redesign; read technical documents such as alignment procedures for spectrophotometers; use electronic instrumentation such as oscilloscope, logic analyzer, voltmeter, spectrum analyzers, function generators and frequency counters; operate shop tools such as drill, lathe, mill, press, sheer, grinder and bandsaw. **Skill in:** soldering to repair or fabricate electronic circuits.

FULL PERFORMANCE KNOWLEDGE, SKILLS AND ABILITIES (typically acquired on the job):

#### ALL OPTIONS

**Knowledge of:** where to go within the organization for needed information; what other divisions' function and capabilities are in order to judge what information should be passed on to different levels of management. **Ability to:** negotiate, exchange ideas, information and opinions with others to formulate policies and programs and/or arrive jointly at decisions, conclusions or solutions.

#### DEPARTMENT OF TRANSPORTATION

##### Materials and Testing Division

**Concrete Operations Section:** **Working knowledge of:** concrete mix theory, its application, and the effects of changes in materials on performance of mixes; various tests for concrete and the engineering properties of materials used to make concrete; effect of the environment on placing and performance of concrete; specifications on concrete materials and structures. **Knowledge of:** properties of different types of polymer concrete, high molecular weight methacrylate, penetrating silane sealer, and different

**MINIMUM QUALIFICATIONS (cont'd)**

**FULL PERFORMANCE KNOWLEDGE, SKILLS AND ABILITIES (cont'd)**

**DEPARTMENT OF TRANSPORTATION (cont'd)**

**Materials and Testing Division (cont'd)**

**Concrete Operations Section (cont'd)**

repair materials. **Ability to:** perform in-depth field inspections on concrete pavements and bridge decks to identify problems; write technical, experimental, and investigative reports on concrete materials and pavements.

**Geotechnical Branch: Working knowledge of:** strength of materials principles, soil testing principles and techniques, rock testing principles and techniques to evaluate engineering characteristics of soils and rocks; soil engineering, soil dynamics, ground anchors, tiebacks, design and analysis of driven pile foundations, design and analysis of drilled shafts, soil slopes and landslides mitigation techniques, rock slopes and rock fall mitigation techniques, design and analysis of retaining walls, highway embankment design and analysis, soil nailing techniques and analysis, ground modification techniques, geotextile design and construction techniques, shallow foundations, settlement analysis to conduct geotechnical engineering analysis and design; pile driving, drilled shaft construction, earthwork construction, blasting, excavation and ground support construction, installation of geotextiles, and subgrade preparation to assist construction personnel in solving construction geotechnical problems; soil identification principles to recognize trouble soils such as expansive, collapsible and frost-susceptible soils; electronic instrumentation such as seismic equipment, signal conditioner, amplifier, generator, hydraulic pump, digital voltmeter, oscilloscope servovalves, and transducers to conduct field and laboratory testing; the department's standard specifications for road and bridge construction. **General knowledge of:** tunneling techniques and principles; environmental, construction, structural, and transportation engineering to recognize potential engineering problems and hazards which can affect a geotechnical design. **Ability to:** coordinate construction of structures by determining the time, place and sequence of actions to be taken on the basis of analysis of data; use geotechnical field instrumentation techniques such as slope indicator and settlement indicator to monitor structural behavior after construction.

**Research and Development Program: Detailed knowledge of:** environmental and economical impacts of proposed research projects. **Working knowledge of:** computer programs and their application to analysis, principles of engineering methods and practices, information sources, roadway and structural plans, materials specifications, and differences in technologies and techniques related to highway construction. **Ability to:** conduct in-field inspections on projects; document collected data.

**Operations Analysis Division**

**Ability to:** write and modify existing computer programs on the State mainframe computer for sorting, merging, tabulating, graphing, and statistically analyzing pavement condition, construction, maintenance, and other costs.

**Road Design Division**

**Hydraulics Section: Knowledge of:** State and federal floodplain management statutes; maintenance techniques and problems so that hydraulic designs can be made as maintenance-free as possible; roadway design policies pertaining to highway drainage designs. **Ability to:** apply engineering judgment in the development of highway drainage plans; identify and assess channel characteristics that are important and sensitive in water surface profile computer models; estimate flood damages that will occur when floods greater than the design flood occur; assess the economic and environmental consequences of the hydraulic design to avoid or minimize the detrimental effects of each; assess hazards imposed by hydraulic structures to traffic and surrounding properties so these hazards can be avoided or minimized; analyze different designs and select the one most appropriate for the situation; utilize complex computer programs for hydrologic and hydraulic modeling; assess the impact of changes made during construction on the

**MINIMUM QUALIFICATIONS (cont'd)**

**FULL PERFORMANCE KNOWLEDGE, SKILLS AND ABILITIES (cont'd)**

**DEPARTMENT OF TRANSPORTATION (cont'd)**

**Road Design Division (cont'd)**

**Hydraulics Section (cont'd)**

overall drainage design and nearby properties so the construction process is not excessively delayed; creatively solve or mitigate drainage problems within the scope of the existing drainage systems; assess the economic, safety, and legal impact of drainage system changes; organize the work flow of trainees to accomplish established objectives; modify and/or adapt hydraulic designs so they will function with the overall highway project.

**Consultant Administration Section - Working knowledge of:** federal, State, city and other agencies' standards related to design items.

**Structural Design Division**

**Bridge Design and Contract Administration/Technical Support Sections: Working knowledge of:** office policies and procedures relating to layout, design, construction and detailing of structural projects; construction procedures and methods related to structural projects; operations of the Materials and Testing Division as it applies to the testing and inspection of structural steel, prestressed concrete and structural concrete; geotechnical engineering as it applies to foundation design of structures. **General knowledge of:** policies and procedures of roadway, hydraulics, right-of-way and utility divisions to incorporate them in structural design. **Knowledge of:** various codes and specifications guides relating to structural engineering. **Ability to:** make decisions based on technical information which affect design, construction, cost, safety and aesthetics of structural projects; review and critique design calculations and drawings submitted by engineers within and outside the department; inspect projects under construction and determine whether or not work meets requirements of the contract plans, specifications and special provisions; inspect existing structures and determine the extent of repair and/or rehabilitation necessary; train and review the work of lower level staff members; compare and evaluate proposals from contractors, consultants, material suppliers and researchers to determine compliance with contract documents and/or departmental standards.

**Bridge Inspection/Maintenance Section: Detailed knowledge of:** data requirements of the bridge inspection/maintenance program and the national bridge inventory; physical properties of construction materials used in bridges. **Working knowledge of:** federal laws pertaining to bridge inspection/maintenance programs and the national bridge inventory; Federal Highway Administration policies regarding bridge inspection/ maintenance programs and bridge maintenance management systems; all bridges in Nevada including, but not limited to, knowledge of owners, locations, construction types and load limits; provisions of the Federal Highway Administration manual on uniform traffic control devices. **General knowledge of:** chemical properties of construction materials used in bridges; environmental standards and regulations.

**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES**

**Division of Environmental Protection**

**Bureau of Air Quality: Knowledge of:** State regulations, terminology and definitions pertaining to air quality; a variety of air pollution sources such as mining operations, power plants, refineries, geothermal plants, asphaltic concrete plants, and cement and lime manufacturing. **Ability to:** analyze complete, multi-faceted technical information and data to determine compliance with applicable regulations and source apportionment.

**MINIMUM QUALIFICATIONS (cont'd)**

**FULL PERFORMANCE KNOWLEDGE, SKILLS AND ABILITIES (cont'd)**

**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES (cont'd)**

**Division of Environmental Protection (cont'd)**

**Bureau of Water Permits and Compliance - Permits Branch: Working knowledge of:** chemical principles, chemical nomenclature, and water chemistry; wastewater treatment principles and practices, sludge treatment and disposal, land application of water; the federal Clean Water Act, and portions of the Code of Federal Regulations, Nevada Revised Statutes, and the Nevada Administrative Code pertaining to water quality; civil engineering, fluid dynamics, and hydrology.

**Bureau of Mining Regulation/Reclamation - Mining Regulation Branch: Detailed knowledge of:** mining regulations and working knowledge of Nevada Revised Statutes, Nevada Administrative Codes, federal regulations, policies and procedures as they apply to protection of groundwater, surface water and air quality. **Working knowledge of:** sampling techniques for soil, surface water and groundwater.

**Bureau of Wastewater Treatment Services - Technical Services Branch: Working knowledge of:** principles of sanitary engineering, soils engineering, hydrology, hydrogeology, fluid mechanics, hydraulic machines, all types of treatment plant operation and construction management; federal and State procurement requirements; applicable requirements of the State Water Pollution Control Laws and Regulations and the Federal Clean Water Act, discharge permit requirements, division design criteria, division guidelines and water quality goals; liners, as well as current methods and systems utilized for the purpose of detecting leakage from impoundments. **Ability to:** perform inspections of all types of treatment works to verify compliance with discharge permit requirements and applicable laws and regulations.

**Bureau of Waste Management - Consultant Certification/Superfund Branch: Working knowledge of:** Federal Register Vol. 55, No. 241 relative to developing a Hazardous Ranking System score for sites being evaluated; safety precautions necessary when conducting a field investigation and approaching a site. **General knowledge of:** other federal, State and local agencies' functions and responsibilities so as to coordinate preliminary assessments, site investigations and emergency response; proper sampling techniques for soils, water and groundwater.

**Bureau of Water Quality Planning - Planning and Standards Branch: Working knowledge of:** the federal Environmental Protection Agency's National Computer Center STORET data entry, retrieval, and analytical procedures; the Federal Clean Water Act, and portions of the Code of Federal Regulations, Nevada Revised Statutes, and the Nevada Administrative Code pertaining to water quality and procedural matters.

**Division of State Parks**

**Working knowledge of:** principles of surveying sufficient to plan and oversee topographic and hydrologic surveys and to locate and stake out proposed improvements in the field; construction safety regulations sufficient to identify and correct violations. **Knowledge of:** soil sampling and testing principles and techniques sufficient to plan and oversee soil investigations to determine such properties as percolation rates, soil gradations and bearing strength; various regulatory agencies sufficient to determine which agencies should review and approve a given project; environmental regulations regarding the storage of underground tanks and piping containing gasoline or diesel fuel. **Ability to:** write documents used in the contracting process such as general specifications, bidding schedules, and various required notices; persuade management and staff personnel to accept recommendations based on technical considerations; create and maintain cooperative professional relationships with contractors and consultants over the length of a contract; teach groups and individuals how to operate various computer programs.

**MINIMUM QUALIFICATIONS (cont'd)**

**FULL PERFORMANCE KNOWLEDGE, SKILLS AND ABILITIES (cont'd)**

**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES (cont'd)**

**Division of Water Planning**

**Ability to:** interact with technical and non-technical personnel from other public and private entities to obtain pertinent data and provide input into their water planning efforts.

**Division of Water Resources**

**Detailed knowledge of:** Nevada Water Law pertaining to Proofs of Beneficial Use; division procedures for preparing and checking certificates. **Working knowledge of:** Nevada Water Laws, statutes, customs and usage regarding water rights. **General knowledge of:** division records, documents and publications. **Ability to:** prepare concise, clear hydraulic engineering reports; organize and review the work of other staff members; meet all levels of the public and represent the division on water right matters.

**DEPARTMENT OF HUMAN RESOURCES**

**Bureau of Health Protection Services**

**Detailed knowledge of:** public health engineering both regulatory and technical in order to remain current in a changing field. **Ability to:** investigate allegations of public health hazards and direct corrective action; prepare briefings for the State Board of Health on new/revised regulations and consult with Board members on technical matters; coordinate policy and procedures with other agencies.

**UNIVERSITY OF NEVADA**

**UNR - Department of Chemistry**

**Working knowledge of:** electronic engineering principles and practices, optical systems, high vacuum systems and laser systems. **Knowledge of:** chemistry; crafts such as carpentry, plumbing, sheet metal, welding, brazing, and machine shop practices; plastics and their properties; safety and hazardous materials practices; UNR purchasing practices to procure equipment or parts from outside vendors. **Ability to:** analyze complex technical data using logic and quantitative reasoning; translate technical engineering terms for non-engineering personnel; analyze information, problems, practices and procedures to define objectives for research; read and interpret electronic, electrical and mechanical drawings and specifications involved in the design and/or repair of instruments; read and follow manufacturer's documents and manuals; use a wide array of electronic and electric test instruments; diagnose and repair inoperative electronic systems; operate wood and metal working machines; use a wide variety of hand tools. **Skill in:** fabricating printed circuit assemblies including soldering, loading and wire wrapping.

This class specification is used for classification, recruitment and examination purposes. It is not to be considered a substitute for work performance standards for positions assigned to this class.

6.226

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